

p. 451), may be assumed to be nearly as follows, as far as we are at present acquainted with it :—

	Area in square miles.	No. of species of <i>Turdus</i> .	No. of sq. miles to each species.
1. Palæarctic	12,500,000	16	780,000
2. Indian	3,100,000	15	200,000
3. Æthiopian	6,500,000	9	722,000
4. Australian	2,600,000	5	520,000
5. Nearctic	5,500,000	12	458,000
6. Neotropical	5,600,000	27	207,000
The whole earth . . .	35,800,000	84	426,000

Whence it plainly appears that the genus has attained its greatest degree of development in South America and India, and that the Palæarctic and Æthiopian areas are comparatively very poor in their number of species.

XXIX.—*On the Ornithology of Ceram and Waigiou*.

By ALFRED R. WALLACE.

(Plate IX.)

EVER since I arrived in the Moluccan seas (now four years ago), I have been repeatedly told, “if you want fine birds, go to Ceram;” and the same idea appears to prevail in Europe, for my correspondent writes me, “Mr. Gould and Mr. Gray both say the birds of Ceram are *very fine*.”

With such encouragement, it was with great expectations I started, in October 1859, for the south-western part of the island. What was my surprise to find one bird very plentiful that was not to be found in Amboyna, and *only one*, namely the *Tropidorhynchus subcornutus*, Temm. ! There was absolutely nothing else ; and the best birds of Amboyna, as *Tanysiptera dea* and *Lorius domicella*, were so scarce that I could not get a specimen of either of them. I changed my locality—I went into the very centre of the island ; but still nothing new, and birds in general scarcer and scarcer. At last, however, after great exertions, I did get two more species new to me, *Eudynamys ransomi* and *Corvus violaceus* ; and one, I believe, new to science, and very interesting

—a new species of *Basilornis**, a genus hitherto containing only a single Celebes species, which that of Ceram closely resembles, but has the crest much elongated and recurved. Of this interesting bird, however, I only got a pair of specimens. And that was really all that three months' collecting produced in much-vaunted Ceram.

It was, however, the eastern part of Ceram that I had heard most spoken of, and I determined to try again, and after nearly two months' delay, owing to illness in Amboyna, I started afresh. My first stopping-place was at Teluti, near the centre of the S. coast, which tempted me by its noble forests, lofty mountains, and rocky streams.

Four days' search, however, convinced me that all was barren ; birds were scarcer than ever; and the natives were quite astonished at being asked about handsome birds, assuring me they knew of none in their country.

I then went on to Kissa laut, near the east end of the island, where I stayed a month, and obtained literally *not one species* new to me, and, moreover, none of the few good things that I had met with, though rarely, in W. Ceram. The forests and thickets were here most wretchedly depopulated of bird-life. Some half-dozen species, mostly noisy ones, were to be seen and heard, indeed, every day and everywhere, such as *Cacatua moluccensis*, the *Trichoglossus versicolor* (?), and *Eos rubra* (the only species of

* Mr. G. R. Gray considers the *Basilornis* of Ceram to be the *Pastor corythaix* of Wagler. It must therefore stand as *Basilornis corythaix*; while the species of Celebes will retain Temminck's name, *Basilornis celebensis*. Both species are figured in the accompanying illustration by Mr. Wolf (Plate IX.), and their differences, which are sufficiently obvious, are pointed out by Mr. Gray, as follows. The two birds "are easily distinguished from one another by the form of their crests. That of Celebes possesses a short, compressed, keel-like crest, which extends from the culmen to behind the head, and is composed entirely of scale-like and convex feathers; whilst that of Ceram has an occipital, erect, and elongated crest, which, when viewed sideways, assumes somewhat of a subtriangular form, and is composed of truncated, rather broad and lax plumes. It also differs in having the nostrils exposed and a naked space round each eye. In the Celebes species the nostrils are covered by the frontal plumes, and there is scarcely any naked space round the eyes."—P. Z. S. April 23rd, 1861.—ED.

these genera found in all the great island of Ceram), and the *Buceros ruficollis* and *Tropidorhynchus subcornutus*. One may search for days, and literally see nothing else but these, with the *Carpophaga perspicillata* and *C. luctuosa* (?). Flycatchers, *Edolii*, Thrushes, Kingfishers, Warblers, Finches, are so scarce as to seem altogether absent. The few species that do occur are only seen singly, and at rare intervals.

On my return from Goram I spent ten days on the N.E. coast, but found nothing. I afterwards met with a gentleman, in the employ of the Dutch government, who is an amateur in ornithology, and has resided in Ceram more than a year, visiting the interior and the N. coast, with one or two hunters always engaged; but he seems to have met with scarcely anything more than myself. *Pitta* seems altogether absent; of *Psittaci* there is but one not found also in Amboyna, the *Platycercus amboinensis*; of *Ptilonopodes*, the two Amboyna species only, *P. viridis* and *P. superbis*. Leaving out *Psittaci*, I have only found 24 Passeres in Ceram, after a more extensive and laborious exploration than I have given to any other island.

The poverty in species and individuals of land birds exceeds anything I have hitherto met with, and seems very unaccountable. I think it must be partly due to the very little cultivation in the island, the population subsisting almost wholly upon sago.

Where there are and have long been extensive clearings of the forest, a different kind of vegetation is found, more fruit-bearing trees and shrubs occur together, and insects are more plentiful. In such localities, if virgin forest is close at hand, birds are almost always more abundant. I believe, however, that though my collection of the birds of Ceram is no doubt very incomplete, the poverty it displays is *real*, and will not be materially affected by future discoveries; and its cause is, I think, to be traced to the general character and origin of the whole Moluccan fauna (contrary to what has generally been supposed, a remarkably poor one), and to the peculiar geographical and geological antecedents of the island of Ceram. At some future time I hope more fully to enter into this subject.

My intention was to have continued my voyage as far as Ké,

visiting all the small islands between it and Ceram, and I much regret that I was not enabled to do so ; but the delay and trouble in getting boats and men from the native Rajahs was so great, that the East monsoon set in and drove me back on the way there. I stayed, however, about a fortnight on the two Matabello Islands (and I believe I am the first European who has ever touched there), and spent also a month at Goram, and in both of them I found several of the Ké birds which I obtained on my voyage to Aru two years ago.

The species of birds in these islands are very limited. A few New Guinea species occur (*Cacatua triton* and *Eclectus linnaei*), probably escaped and naturalized. The *Eos* and *Trichoglossus* are the Ceram species.

The *Carpophaga*, both at Goram and Matabello, is the fine species found at Banda and Ké. I sent it from Aru ; but as it inhabits there only one small island nearest Ké, it has, no doubt, recently emigrated, and is not a true New Guinea bird. G. R. Gray identifies it with *C. chalybura*, Bp. ; but this I doubt, as it certainly does not agree with the description in the 'Conspectus,' and the locality of *C. chalybura* (the Philippines) is much against its being the same.

In Matabello, the only *Ptilonopus* seems to be the *P. prasinorhous*, Gray. In Goram the same species occurs, in company with the *P. viridis* of Ceram. The *Dicrurus* of Goram is a large species, very different from that of Ceram, and probably the *D. megalornis* of Ké. I am decidedly of opinion, therefore, that the Ké Islands do not belong to the New Guinea fauna, but, with Banda, Goram, and the intermediate islands, form a little subgroup of the Moluccas, perhaps also including Timor laut. None of them, as far as we know, contain a single true Papuan form, as *Rectes*, *Manucodia*, or *Cracticus*, which are found even in the smaller islands of Aru. The species peculiar to them should therefore be erased from the list of New Guinea birds.

The Cassowary occurs rather plentifully over the whole interior of Ceram, but I was never able to obtain or even see a specimen. In a native house I found an upper mandible and crest, which may perhaps show if it differs from the New Guinea species. A residence in the interior of Ceram with the indigenes might pro-

duce several novelties ; but the too palpable poverty of the country would not permit me to bestow more time upon it, with the glorious Papuan region almost within sight.

Leaving Goram, therefore, I intended to go to Mysol, to visit my assistant Mr. Allen, who had been there three months, and then go on myself to Waigiou. My Goram crew, however, ran away, and I was detained, first in E., and then in N. Ceram. I afterwards had an adventurous voyage, in my little native prahaw purchased at Goram, being driven to leeward of Mysol, and then, when at anchor off an uninhabited island, our anchor (a native wooden one) broke in the coral rocks, we drifted away, and our two best sailors were left on shore. We could not possibly get back, as wind and current were against us ; they alone knew the proper channels about Waigiou, and we were consequently eight days puzzling our way, in great peril, among the shoals and coral reefs. On reaching a village, we hired a boat and men to go to the island ; but bad weather came on, and the boat returned in a fortnight, without having reached it. Again we induced them to go back, and in a fortnight more they returned with the two sailors, who had lived a month, naked, and eating only leaves, roots, and shellfish, having luckily found water, though the island was only about a mile in diameter.

I have written thus far in Waigiou. About the birds of Waigiou I will tell you when I have returned to Ternate.

Judging from the birds said to have been obtained at Waigiou by the French naturalists, I had expected to find it a very productive locality. *Epimachus magnus*, *Paradisea papuana*, *P. rubra*, *Diphyllodes magnifica*, *Cicinnurus regius*, *Lophorina superba*, *Parotia aurea*, and *Sericulus aureus*, are all mentioned as Waigiou birds. My disappointment may therefore be imagined when I discovered that the whole of these birds, with one exception, had been brought from the mainland of New Guinea (whither many of the inhabitants make an annual voyage), and that the sole representative of these gems of the New Guinea fauna was the *Paradisea rubra*, which is absolutely restricted to the island, where it takes the place of the *P. papuana* of the mainland.

I remained in Waigiou about four months, much hindered by

excessive wet, and by having only a single gun good for anything. During the first two months, which I spent at Muka on the S. coast of the island, I obtained only two males of *P. rubra*. I afterwards visited the district of Bessir, where there are a few natives who catch the birds and prepare the skins, and obtained a very fine series in this locality.

The *P. rubra* is obtained in quite a different manner from the allied species of Aru and New Guinea. It is always caught alive by snares placed on the trees it frequents, and to a branch of which is hung the large red fruit of a species of *Arum*, of which the bird is very fond. The noose is placed in such a position that the bird must perch on it to get at the fruit; and it is attached to the branch by an ingenious slip-knot, so that when the end of the cord which descends to the ground is pulled, the bird is caught by the leg and dragged down. It may be thought that, the specimens being unwounded, and captured alive, I should obtain them in much finer condition than those that are shot; but such was not the case, and I have never been so much troubled with any Birds-of-Paradise as I was here. At first they were brought to me alive, bundled up in a bag, and with the plumage and tail-cirri terribly rumped and broken. I then showed them how to perch them on a stick, attached by the leg; but then they were often brought dreadfully dirty, having been allowed to get among ashes or sticky dammar-torches during the time they were kept in their houses. In vain I begged them to bring the birds to me directly they were caught; in vain I begged them to kill them directly and hang them up. They would do neither, because it was a little more trouble. I had four or five men in my employ, who were paid in advance for a certain number of birds (the only way to get them). These men distributed themselves about the jungle, often a day's journey from the village, in search of good localities to set their snares. Having got one bird, they did not like the trouble of bringing it home, but would wait as long as they could keep it alive; and thus they often came to me, after a week or ten days' absence, with one bird dead and almost stinking, another freshly dead, and a third alive and just caught. Notwithstanding all my endeavours to alter this system, it continued in full force

to the end. Luckily, however, the plumage of these birds is so firmly set that they are washed and cleaned more easily than any others, and thus a few hours' extra work was all their obstinacy cost me.

Having these beautiful birds brought to me alive, I, of course, made many attempts to preserve them. With my own hands I constructed a large cage in which they could move about freely, and tried every kind of food I could procure. The proper fruits were, however, scattered widely over the forest on lofty trees, and could not be obtained enough ripened with sufficient regularity. Rice and grasshoppers they soon came to eat pretty eagerly, and I was then in hopes of success; but on the second or third day they were invariably attacked by a kind of convulsions, fell off their perch, and soon died. I tried altogether seven or eight individuals, apparently in perfect health, and in every case with the same result. Some were full-plumaged, others without lateral plumes; but I could not obtain any very young birds, with which the attempt might probably have succeeded better.

The live birds were principally remarkable for their excessive activity and liveliness. They were in constant motion; and the brilliantly contrasted colours of the head and neck, with the erected crests and swelling throat, formed a most beautiful picture. I never saw the red lateral plumes fully expanded, and can therefore form no judgment as to their beauty. They were generally carried under the wing, rising a little over the back, with the white curved tips drooping over the end of the tail. The long flattened tail-cirrhii hang down in a graceful, spiral curve, which is produced by the general curved form of these feathers (which lay naturally in a complete circle reaching round to the head of the bird) combined with the semicylindrical sectional figure. These plumes pass through a variety of singular forms before they become fully developed. First they appear as simple cirrhii, like those of *P. apoda* and *P. papuana*: these have often a spatulate tip, as in *Momotus* and *Tanysiptera*. The rachis then becomes flattened out and slightly curved, and finally black, curved cylindrically, and entirely destitute of barb. In one singular example I possess, a single cirrhus has

a spatulate feather tip to the fully-developed black whalebone-like rachis.

The *Paradisea rubra* differs from its allies in the colour of the bill, which is a pretty clear gamboge- or ochre-yellow, with a very faint greenish tinge; the iris is of a blackish olive; the feet dark reddish or fleshy olive; the claws horny. Its voice is very similar to that of its allies, but less shrill, and like them it seems to be very abundant in its native forests, though, from its activity and incessant motion, by no means easy to procure. I several times observed the adult males on low trees and among bushes only a few feet from the ground. They crept along the branches and up the nearly vertical trunks, apparently in search of insects, which, I believe, they only feed on when their favourite food, the "*warmgin*," or Indian fig, is not to be obtained. At these times they utter a low clucking note, very different to their usual shrill call, which seems always to proceed from the summits of lofty trees.

Epimachidæ are altogether absent from Waigiou. The nearest ally to the *Paradiseæ* is *Manucodia*, of which only one species is found. Of the rare Parrots imputed to Waigiou, *Psittacodis stavorini* and *Chalcopsitta rubiginosa*, I could see or hear nothing. In fact, I found no *Psittaci* that I had not previously obtained, and none but very common species. Of Pigeons I obtained many species, but few new. The most abundant *Carpophaga* was *C. sundevalii*, one of the hump-beaked group. The swelling seems equally large in both sexes. Three other New Guinea species occur, and also the Gilolo *C. perspicillata*. The *Ptilonopus prasinorrhous* of Ké and Goram occurred here also on the small islands, while on the mainland of Waigiou, *P. superbus* and the lovely little *P. pulchellus* are the characteristic forms. There is, I think, a new species, of which I got a male in Gagie Island, and which also occurred in Mysol, marked only with a vinous patch on the breast. Of the splendid *Ianthænas halmaheira*, Bp., or a closely allied species, I obtained a single specimen, and also one of a species of *Eutrygon*. Of other birds I got scarcely anything new, besides one or two *Rectes* and *Myiolestes*, a fine *Podargus*, and one or two small birds. My whole collection only amounted to 74 species, almost all common New Guinea birds; and I un-

hesitatingly pronounce Waigiou to be the very poorest island in the New Guinea zoological region.

On my arrival in Ternate I found my assistant Mr. Allen, who had spent more than six months in Mysol, and it was with much anxiety I proceeded to examine his collection. I was much disappointed, however, in finding almost all my own birds over again, with the addition of a few Dorey species and about 15–16 new to me, mostly of the genera *Campephaga*, *Rectes*, *Myiolestes*, and a few Hawks,—a Rail, a Kingfisher, and the *Eos atra*.

Owing to his having to return to Ceram for rice, and waiting there two months till it arrived from Amboyna, he missed the season for the Paradise-birds, obtaining only a single *P. papuana*, a few *P. regia*, and of the third species which inhabits the island, *Diphyllodes magnifica*, only a native skin. Successive visits of several months each to four distinct Papuan districts have only produced me four species of Paradise-birds, while the general run of the birds is so nearly identical in all as to make a fifth visit absolutely profitless, except by obtaining the remaining species of these beautiful creatures. I have, however, at length obtained very precise information as to where the greater part, if not all, of my desiderata in *Paradisææ* and *Epimachidæ* are to be obtained, and in a few days Mr. Allen starts for this locality with every requisite for a thorough exploration, in my own Goram prahaw, and accompanied by a lieutenant and two soldiers from the Sultan of Tidore to assist and protect him. If he does not succeed this time, I must give up the attempt in despair. He touches for a few weeks at Guebe, and on his return goes for a month to the Xulla Islands, which contain the *Babirusa*, but of which the fauna is otherwise totally unknown.

I myself leave by the next steamer for Timor Delli: on my return I spend two months at Bouru, where the *Babirusa* is also found; but whether its fauna is of the Moluccan or of the Celebes type, we are yet ignorant. In September we are to meet again here, to pack up our collections, and shall then finally quit the district of the Moluccas and New Guinea. Please make allowance for these hasty notes, written amid the confusion and fatigue of packing.

Ternate, Dec. 20th, 1860.



J. Wolf, del et lith.

M & N. Hanhart, Imp^r.

Fig. 1, BASILORNIS CORYTHAIX. Fig. 2, B. CELEBENSIS.